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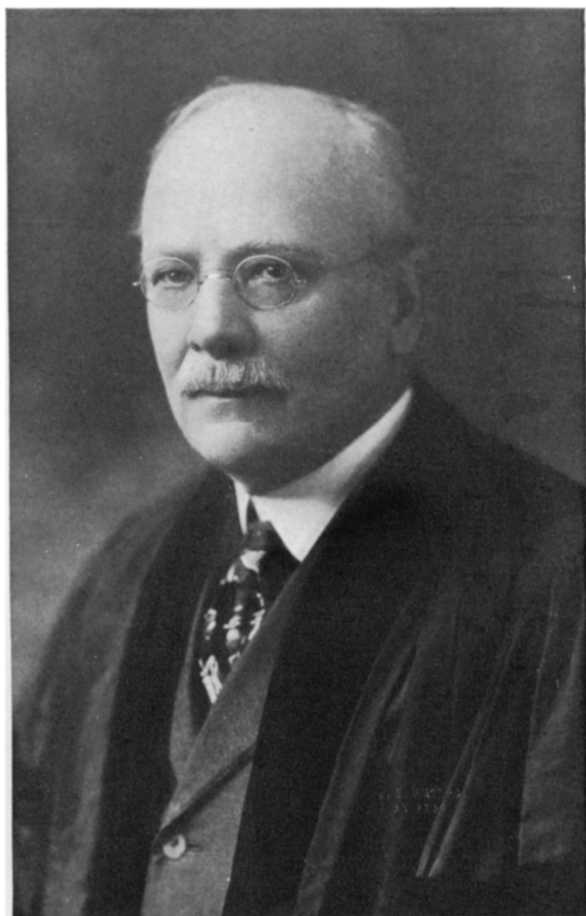
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SAMUEL WENDELL WILLISTON

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THE MAN AND THE PALEONTOLOGIST

Our distinguished senior colleague in vertebrate paleontology passed away August 30, 1918, honored and beloved by all who knew him. He seldom spoke of himself to his scientific associates, still less of the long struggles which beset his early career, and we owe to unpublished autobiographical notes, written in May, 1916,* the full and thoroughly American history of the period of his boyhood, youth and early manhood, in which the beginnings of his scientific life on the western frontier, in the 60's of the last century, are delightfully portrayed. Our admiration for Williston's character and attainments is enhanced when we follow his early steps and see how his strong predisposition to a life of scientific research finally prevailed over all difficulties. The story reveals a lofty spirit and unfaltering determination, which affords a splendid example to many of our youth, whose careers are rendered easy by the wonderful facilities of laboratories and museums in all parts of our land, who may thus fail to acquire the rugged determination which Williston transferred from his manual to his intellectual life.

Williston tells us that his father's family goes back to 1630, in Massachusetts. His father was naturally intelligent but never learned to read. His mother's family came from England near the close of the War of 1812. She was well educated. He himself was born in Roxbury, now a part of Boston, July 10, 1852. His earliest recollections are of the torchlight celebrations of the John C. Fremont campaign of 1856. Considering his subsequent fame from the study of the Permian amphibia, it is interesting to note that among the first memories of his childhood is one of a collection of toads, which he proceeded to plant in the garden to see them grow, after the manner of potatoes.

In the spring of 1857 the Willistons emigrated to Kansas. The trip was long and tedious by rail to St. Louis, then a small town, thence by steamboat up the Missouri River to Leavenworth—there was no Kansas City then—followed by a long and tiresome drive of 115 miles to Manhattan. Their home was a small log cabin, about

*See *Recollections*, an unpublished autobiography, written May 1916, copy-righted by Mrs. S. W. Williston. Also *Biographic and Scientific Notes on S. W. Williston*, by Prof. William K. Gregory, Mss. Osborn Library, American Museum of Natural History.

15 feet square, containing a single room below and a loft above where the four boys slept. Indians were numerous and occasionally troublesome. Here young Williston began school, and in a small library, provided by the Emigrant Aid Society, he recalls finding Stevens' *Antiquities of Central America*, which he read when he was about seven years old, also Prescott's *Conquest of Mexico*.

His first collection of fossils was from the Blue Mont, a high bluff just north of Manhattan, where he discovered some fossil shells. He was told by his father and by his Sunday School teacher that they had been left there by the great deluge, which once covered all the earth. His favorite swimming hole was among some large stones filled with fossil shells of lower Permian age, and these constituted his first observations in paleontology, when but seven years of age. At the age of nine he assisted his father, attending the engine of a saw and grist mill. During this time he also got his second lesson in natural history, in observing the anatomical differences between various kinds of fishes,—catfish, shad and buffalo, and river sturgeon of the Blue River.

Blue Mont College, founded by the Methodists in 1859, became merged into the State Agricultural College in 1864, and Williston was a very happy boy when in 1866 he was permitted to enter it at the age of fourteen. His school days were interspersed with hard manual labor and with learning the printer's trade, his first article being a humorous contribution about the capture of Jefferson Davis, published at the age of thirteen.*

His studies at the College continued with two most influential events, first, the reading of Lyell's *Antiquity of Man* at the age of fifteen, which at once convinced him of the truth of the doctrine of evolution; and, second, the remarkable teaching of Professor Benjamin F. Mudge. Williston writes; "I studied every study that he taught and they were many,—Natural Philosophy, Chemistry, Botany, Geology, Zoölogy, Veterinary Science, Mineralogy, Surveying, Spherical Geometry, Conic sections, Calculus, etc. Mudge had a considerable collection of fossils and minerals that filled a long case. To me it was a wonderful museum. There were no laboratories of any kind, no microscopes and but few instruments. The College cata-

*It is an amusing parallel that at the corresponding age of thirteen, the present writer was engaged in printing, typesetting, press work, and editorial work on a small boys' journal.

logue of about that time enumerating their equipment, gravely mentions an electric machine, three Leyden jars and six test tubes. The electric machine was a never ending source of delight. The Professor occasionally got it out and charged the Leyden jars, and then with hands joined in a circle gave us a shock. He prophesied that some day, electric light would take the place of other illuminations. My ambition was to make a machine myself, and I nearly succeeded, but I found no way of boring a hole through the glass plate for the shaft. The oxyhydrogen light was another wonder. My greatest interest was given to physics or natural philosophy as it was then called. I read every book on the subject that I could get in the library. Chemistry had second place, while biology interested me but little."

We observe that in this preparation for a really great subsequent scientific career, Williston found Lyell, the master who inspired Darwin. He also came under the influence of a most genial and inspiring teacher; the range of his reading as well as of his studies was extremely broad; he showed a marked predisposition for the study of fossils and for comparative anatomy.

He now began to undergo one physical difficulty after another in search of means of living and of carrying on his education; he tried the printing office, also engineering in which he became an expert assistant; at one time he was eager to be an engineer and studied all the books that he could get. It was this profession that prepared him for his field life for his subsequent observations in geology. After three years' experience as a civil engineer, his life took a complete turn, when he began the study of medicine with his old family physician. Freely using the doctor's library, Williston turned to his initial studies in anatomy and physiology, which laid the foundation of his anatomical training and ultimately qualified him for a professorship in the Medical School of Yale University. At the same time, chemistry was more seriously studied. On returning to the Agricultural College, Professor Mudge renewed his great personal influence, and Williston entered on more advanced lines of thought. At the age of twenty-two he was elected the first President of the Kansas State Agricultural Alumni, and chose for his address a tirade against the study of the ancient languages.

In the meantime, he had become an enthusiastic disciple of Darwinism, which was not at that time accepted as a demonstrated fact. In February, 1874, he delivered in the local Congregational Church

what he believed was the first public lecture given west of the Mississippi River in favor of evolution. Perhaps the most signal and unique demonstration of the doctrine of evolution was the famous specimen of *Ichthyornis*—the bird with teeth—discovered by Professor Mudge in 1872. Mudge was at the time extending his geological journeys into western Kansas and invited Williston to go with him. This was really the turning point in Williston's life; it came about through a fortunate accident. He writes that a college friend, Brous, was invited by Professor Mudge to accompany him, and that through Brous he also was invited. The decision to go was accidental and thoughtless yet it led to his life's devotion to paleontology. Had he not accompanied Mudge and Brous, in all probability he would have continued as a practitioner of medicine somewhere in Kansas. The experiences with Mudge were epoch-making; wonderful specimens were sent to New Haven and described by Professor Marsh. Two seasons were spent in this way, chiefly along the Smoky Hill Valley and as far west as Fort Wallace, where he had adventures among the Indians. He accepted an invitation to follow the collections to New Haven and to work under Professor O. C. Marsh. He writes: "It was thus with feelings almost of awe that I met Professor Marsh for the first time at New Haven, Connecticut, on March 19 or 20, 1876. My heart was in my mouth when I knocked at the basement door of the old Treasury Building, and heard the not very pleasant invitation to 'come in.' There was a frown on Marsh's face, accentuated by his nearsightedness, as he waited for me to state my business. No doubt he thought me a wild and woolly westerner in my military cloak, slouch hat and cowboy boots as I stammered my name. But he quickly made me feel more at ease. He found me quarters in a little building in the rear of Peabody Museum then approaching completion. The next day he set me at work studying bird skeletons with Owen's *Comparative Anatomy* as a guide. He was then deeply interested in his *Odontornithes*, and wanted newer specimens especially of the smaller forms which were very difficult to find in the Kansas chalk. For recreation I helped a few hours every day to carry trays of fossils to the Museum."

It is important to dwell in detail on these early steps of Williston's career, because they are of such forceful interest to young men. His subsequent life also had many episodes in which he was always surrounded with difficulties. In September, 1877, he was sent

to the great Upper Jurassic beds, containing giant Sauropods, near Cañon City, Colorado, and Como, Wyoming. In 1878, he made his first brief communication on these animals, but was given no opportunity for further publication in vertebrate paleontology during the nine years (1876-1885) that he worked in Professor Marsh's laboratory. As there seemed to be no opening in paleontological research, Williston turned again to the study of Diptera, which he had begun many years before in Kansas. This became his avocation, and his numerous publications on the flies have given him a leading position among American, if not among the world's, students of these insects. His connection with the Yale Medical School began in 1885-1886 as Demonstrator of Anatomy, and was followed by a professorship of Anatomy 1886-1890, also by the practice of medicine.

The most fortunate turn of Williston's life was his recall to Kansas as Professor of Historical Geology and Anatomy in the University of Kansas. He soon began to publish on the Cretaceous reptiles of the sea and air of that ancient territory,—the plesiosaurs, the mosasaurs, the sea turtles, the pterodactyls. He renewed his explorations in western Kansas and at the same time sustained his two avocations of anatomy and dipterology. It was characteristic of his many-sidedness that he served as Professor of Anatomy and Dean of the Medical School. In 1897 he returned to the subject of the amphibia, the animals first observed in his early boyhood, and published the first of his long series of notable papers on the extinct amphibians, which constitute one of his most permanent claims to fame as a paleontologist. Ten years later the Palaeozoic reptiles first attracted his attention.

In 1902 he was called to the University of Chicago, as Professor of Vertebrate Palaeontology, the highest post of its kind in this country. In addition to his arduous labors as lecturer and teacher he completed his special papers, memoirs and bulletins on the Cretaceous sea reptilia and also brought to a conclusion his life studies on the Diptera, publishing the third edition of his *Manual of North American Diptera* in 1908,—a classic work on this subject.

Now began the more extended and exclusive studies and researches on the life of the Permian period, to which Williston has made monumental contributions and which continued up to the very hour of his last illness. As the scientific successor of the great Cope, who first made known these remarkable reptiles, and continuing the

special studies of Dr. George Baur, he began to publish in 1907, and during the next decade poured out a series of papers which all together constitute his greatest and most original contributions to science. It was in the extremely intricate and complicated osteology of these extinct forms that his long and precise training, his passion for accuracy of statement and description, came to bear. Aided by Mr. Paul C. Miller, a collector and preparator of exceptional ability, he undertook a long series of field explorations in the Permian of Texas, which yielded results of the greatest importance to vertebrate morphology and paleontology. These expeditions brought back to the University specimens which have become classics in their completeness and beauty of preparation. He extended his studies to the Marsh collection in the Yale Museum and to the great Cope collection in the American Museum of New York. Form and function, structure and habit, movement and environment were always closely related in Williston's mind and observations, as they have been by the greatest paleontologists from the time of Cuvier to the present day. He first developed his life theories of the reptiles of the Kansas seas and their environment, and his work along these important lines of interpretation, especially in their adaptations to aquatic life, are summarized in his delightful volume, *Water Reptiles of the Past and Present*, published by the University of Chicago, 1914.

It is a matter of lasting regret that a greater treatise summarizing all of his researches on the habits and structure of the extinct reptilia was not brought to completion. This would have contained an epitome of all his life work and would have marked the close of an important epoch of exploration on the Paleozoic and Mesozoic reptiles and amphibians. We hope that this treatise will pass into the hands of one who is both willing to do justice to Williston's great work and competent to sustain the high level which marked his entire scientific career.

All scientific men have their special aptitudes, but very few cover so broad a field and so many subjects with such signal success as did Williston. Few have overcome greater difficulties or have kept the life goal more steadily in view. He strove arduously through forty years of investigation to discover new material and to widen the firm basis of fact in many distinct fields. He preferred to discover new material of his own rather than to work over old material or to reinterpret the work of others. Nevertheless, espe-

cially in his latter years, he labored very successfully to coordinate the work of his predecessors and colleagues, as, for example, in the classification of the extinct amphibia and reptilia, in which he surveyed the previous work of Cope, Osborn and others, with clear discrimination.

Although he ardently adopted the theory of evolution and was ready to embrace new ideas from every source, yet his views on standards of classification, like his views on paleontology problems, were uniformly sober, moderate and well considered. He carried his rare sense of humor and genial spirit into all that he said and all that he wrote, as well as into his addresses and speeches. His career marks the transition period between the work of the founders of American paleontology—Leidy, Cope and Marsh—and that of the large and increasing younger school of men who are taking up this wonderful subject and who may well follow his high example of unswerving integrity as an observer and broad philosophy as a generalizer.

While we sorrow over his loss and keenly miss him from our councils, it is delightful to recall that his personal relations with colleagues, assistants and students were eminently kindly. He was very generous in his praise of the work of other men and showed none of that jealousy which had so long blighted the progress of American paleontology and served to warp and suppress the truth.

HENRY FAIRFIELD OSBORN